

38 regular stations of the Weather Bureau, either by its photographic or its thermal effects. The cloudiness is recorded by personal observations at all stations and is given in the column of "average cloudiness" in Table I.

SUNSHINE.

An instrumental record of sunshine has been kept during the month at 17 stations by means of the photographic sunshine recorder and at 21 stations by means of the thermometric sunshine recorder; the results of these observations are given in Table IV, for each hour of local mean time (not seventy-fifth meridian time). The stations recording the largest percentages of sunshine between the hours of 11 a. m. and 1 p. m. were: Tucson, 95.5; Salt Lake City, 94; San Francisco, 90; Denver, 88.5; Santa Fe, 88; Key West, 87. The stations having the least percentage between those hours were: Rochester, 21.5; Spokane, 24.5; Portland, Oreg., 31; Buffalo, 38; Cleveland, 39.5; Bismarck, 40.5.

The general average percentage for the whole month is given in the next to the last column of Table IV. The highest percentages were Tucson, 96; Santa Fe, 91; Denver, 81; Salt Lake City, 80; Dodge City, 79; San Francisco, 77; Galveston and Memphis, 75. The lowest percentages were: Rochester, 15; Buffalo, 24; Spokane, 26; Portland, Oreg., 28; Cleveland, 33; Bismarck and Chicago, 37.

CLEAR SKY.

The average cloudiness between sunrise and sunset, as based on numerous personal observations, is given for each Weather Bureau station in Table I; the complement of this average cloudiness gives the observer's estimated percentage of clear sky and these latter numbers are given in the last column of Table IV.

COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the duration of direct sunshine whence the percentage of possible sunshine is derived; the

observer's personal estimates give the percentage of area of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for this month is 8 per cent for photographic records and 7 per cent for thermometric records. Attention has lately been called to a similar excess in the record of the observers in India.

Difference between instrumental and personal observations of sunshine.

Photographic stations.	Instrumental.			Thermometric stations.	Instrumental.		
	Instrumental.	Personal.	Difference.		Instrumental.	Personal.	Difference.
Tucson, Ariz.	95	86	10	Salt Lake City, Utah.	80	68	12
Santa Fe, N. Mex.	91	82	9	San Francisco, Cal. * ..	77	72	5
Denver, Colo.	81	62	19	Key West, Fla.	74	56	18
Dodge City, Kans.	79	67	12	Vicksburg, Miss.	73	72	1
Galveston, Tex.	75	75	0	Little Rock, Ark.	72	66	6
Memphis, Tenn.	75	69	6	Baltimore, Md.	70	61	9
Kansas City, Mo.	70	56	14	St. Louis, Mo.	64	63	1
Savannah, Ga.	58	69	-1	Wilmington, N. C.	64	66	-2
San Diego, Cal.	67	59	8	New Orleans, La. † ..	61	61	0
Washington, D. C.	65	66	-1	Philadelphia, Pa.	57	51	6
Cincinnati, Ohio.	55	44	11	New York, N. Y.	56	50	6
Eastport, Me.	47	35	12	Louisville, Ky.	56	44	12
Helena, Mont.	45	45	0	Columbus, Ohio.	53	47	6
Bismarck, N. Dak.	37	38	-1	New Haven, Conn.	53	53	0
Cleveland, Ohio.	33	27	6	Boston, Mass.	49	46	3
Portland, Oreg.	28	36	-8	Portland, Me. † ..	44	38	6
Spokane, Wash.	26	19	7	Des Moines, Iowa.	43	41	2
				Detroit, Mich.	42	37	5
				Chicago, Ill.	37	35	2
				Buffalo, N. Y.	24	16	8
				Rochester, N. Y.	15	19	-4

* A thermometric sunshine recorder was substituted for the photographic recorder on November 14, but as no comparative records were furnished therefore this difference of 5 for the whole month depends on both forms of instruments, and is omitted from the general means.

† Hourly values for 22 days; total and percentages for 30 days.

‡ Record for 21 days.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of November, 1894:

Heights of rivers above low-water mark, November, 1894.

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La.	29.2	4.2	10, 11	5.4	28-30	1.2
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	1.4	3-5	0.2	24-30	1.2
Little Rock, Ark.	23.0	3.8	6	2.3	26-29	1.5
<i>Missouri River.</i>						
Bismarck, N. Dak.	75.0					
Pierre, S. Dak. * ..	13.0	2.1	1, 2	1.8	13-17	0.3
Sioux City, Iowa.	18.7	6.4	1	5.6	12-14, 18	0.8
Omaha, Nebr.	18.0					
Kansas City, Mo.	21.0	7.1	2, 3	5.0	30	2.1
<i>Mississippi River.</i>						
St. Paul, Minn.	14.0	2.6	29	1.0	17-18	1.6
La Crosse, Wis.	10.0	2.7	13, 15	0.8	29	1.9
Dubuque, Iowa.	16.0	2.8	17	1.0	23-24	1.8
Davenport, Iowa.	15.0	1.9	19	0.4	30	1.5
Keokuk, Iowa.	14.0	1.3	19, 22	0.2	30	1.1
Hannibal, Mo.	17.0	1.7	19, 20, 23	1.0	1, 2, 29, 30	0.7
St. Louis, Mo.	30.0	3.4	9, 10	2.5	1, 2	0.9
Cairo, Ill.	40.0	4.9	27	2.9	1-3, 5	2.0
Memphis, Tenn.	33.0	— 0.1	28-30	1.4	6-8	1.3
Vicksburg, Miss.	41.0	— 4.1	30	5.2	9-14	1.1
New Orleans, La.	13.0	3.4	3, 4	2.0	15, 16	1.4
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	7.5	22	1.8	1	5.7
Cincinnati, Ohio.	45.0	8.9	27	3.5	2	5.4
Louisville, Ky.	24.0	5.0	29	2.8	1, 8	2.2
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	1.6	28, 30	— 0.1	1-3	1.7
<i>Tennessee River.</i>						
O Chattanooga, Tenn.	33.0	2.3	3	0.7	18	1.6
Knoxville, Tenn.	29.0					

Heights of rivers—Continued.

Stations.	Danger-point gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Monongahela River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Pittsburg, Pa.	22.0	6.7	7	5.0	1, 14	1.7
<i>Savannah River.</i>						
Augusta, Ga.	32.6	15.3	4	5.4	12	9.9
<i>Willamette River.</i>						
Portland, Oregon.	15.0	5.6	27, 30	1.9	22	3.7
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0					
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	0.4	27	— 0.5	15	0.9
<i>James River.</i>						
Lynchburg, Va.	18.0	2.4	3	0.1	23, 27-30	2.3
<i>Sacramento River.</i>						
Red Bluff, Cal.	22.0	2.5	28	0.8	3-5	1.7
Sacramento, Cal.	25.0	9.3	1, 2	8.2	24-27	1.1
<i>Des Moines River.</i>						
Des Moines, Iowa.	19.0					

* Record for first 17 days only.

† Record for first 18 days only.

FLOODS AND NAVIGATION.

The above reports show that no floods occurred in the principal rivers and none were reported elsewhere. Owing to the low stage of water in the Ohio, Missouri, and upper Mississippi rivers navigation was generally impeded or stopped altogether, and in the lower Mississippi was often conducted with great difficulty.

ICE IN RIVERS.

The condition of navigation as affected by ice and the low water is shown in the following paragraphs:

Red River of the North.—University, N. Dak., 19th, river frozen over. Fergus Falls, Minn., 10th, river closed by ice.

Wisconsin River.—Stevens Point, Wis., 11th, river frozen.
Des Moines River.—Des Moines, Iowa, 18th, river frozen.
Lake Pepin.—Pepin, Wis., 19th, frozen.
Thunder Bay River.—Alpena, Mich., 19th, frozen.
Kennebec River.—Gardiner, Me., 28th, closed for navigation.
Red River.—Shreveport, La., 24th, navigation suspended on account of low water.
Missouri River.—Williston, N. Dak., 18th, frozen over.
 Pierre, S. Dak., 10th to 14th and 17th, running ice; 18th, west channel closed during the night and east channel partly closed. Forest City, S. Dak., 10th, ice in river. Santee

Agency, Nebr., 19th, floating ice. Plattsmouth, Nebr., 10-12th and 19th, floating ice. St. Joseph, Mo., 19th to 24th, ice running in river.

Mississippi River.—Winona, Minn., 30th, river closed. St. Paul, Minn., 29th, frozen; 30th, river gauge readings suspended for the season. Le Claire, Iowa, 21st-27th, floating ice; 28th, river closed by ice. Muscatine, Iowa, 19th, floating ice. Davenport, 19th-21st and 27th, floating ice. La Crosse, Wis., 11th, ice in the stream; 18th, ice along the shore; 19th, river full of floating ice. Keokuk, Iowa, 25th, navigation closed.

OBSERVATIONS ON THE GREAT LAKES.

REPORTS FROM U. S. LIFE-SAVING STATIONS.

Through the co-operation of the General Superintendent of the Life-Saving Service and the Secretary of the Treasury, the Weather Bureau has received monthly reports for the

month of November, from the keepers of 37 U. S. Life-Saving Stations on the Great Lakes.

REPORTS FROM VESSELS.

The Lake Marine Section, Forecast Division, has received reports from the captains of 39 vessels navigating the Great Lakes.

STATE WEATHER SERVICES.

A tabular summary of the more prominent climatological features of each State and Territory, as given in the reports for November by the directors of the respective State Weather Services, is presented in Table XII. This table gives for the whole area of any State: (a) the average departure from the normal values of the current monthly mean temperatures and total precipitations; (b) the maximum and minimum temperatures and precipitations; (c) the greatest and least monthly ranges of temperature occurring anywhere within the State. This table is essentially a summary of Table II, and therefore presents a somewhat different study of meteorological conditions from that given in Table I, which is based on regular Weather Bureau stations arranged in so-called climatic districts.

The following extracts are taken from the reviews published by the respective services; occasional notes in brackets are added by the Editor:

Alabama.—The month of November will pass into meteorological history as one in which the rainfall was the least for a number of years. This deficiency in rainfall has kept the rivers at an unusually low stage, preventing general navigation. Some of the highest temperatures of the month were recorded on the 2d and 3d and the coldest weather on the 12th, the temperatures falling to freezing or below.

Arkansas.—The weather was favorable for gathering crops, but too dry for fall-sown wheat and oats. Forest fires prevailed in several counties, destroying much timber and some fencing, but otherwise did but little damage.

Florida.—The spell of cold weather on the 12th and 13th was unusually severe for the time of year. The temperature fell to, and in some cases below, the freezing point generally throughout the western portions of the State. At Jacksonville on the morning of the 12th it reached the lowest point ever reached during the second decade of November since the beginning of observations by the Weather Bureau in 1871. The frosts are reported to have done but little damage except to tender vegetation.

Georgia.—A pleasant month with no storms of marked severity.

Idaho.—The month was generally fair and pleasant all over the State, with the exception of the 16th, when a decided cold wave was experienced in all sections.

Indiana.—The conditions of the weather during November were very pleasant and favorable for farm work, and corn gathering was completed, but young crops and pasturage suffered more or less for want of rain; wells, springs, and many smaller streams having become dry, farmers continued to haul water for the live stock.

Iowa.—The month was generally favorable for farm work, but too dry for the farmers' needs, especially in localities where there was a scarcity of stock water.

Nevada.—The three months ending with November closed a remarkable period of weather for this State. The temperature while naturally decreasing remained abnormally high. The sunshine was far in excess of the nor-

mal, there being an average of 20 clear days during this month. On several occasions earthquake shocks have been felt, but no serious damage has been done. First killing frost occurred at Golconda on the 16th. Stofiel: Not for several years have we had such a mild November; trees are putting forth abnormal buds and green grass is two inches high.

New England.—The month has been very disagreeable in the north with much cloudy and stormy weather, though the total precipitation was light. The streams and wells there are much lower than usual at this season. Eleven cyclones and nine anticyclones influenced the weather of New England for this month. One of these cyclones formed just south of New England and moved up our eastern coast; it was the most severe for the month in all southern sections; it formed off the New Jersey coast on the 5th and passed east of us with rapidly increasing energy, giving heavy rain and snow and high gales. The snow was very damp and froze to whatever it came in contact with. Telegraph and telephone wires were like great cables, and trees and shrubs were heaps of ice and snow. The weight of this load with the high gale that prevailed did great damage to fruit and shade trees and brought down telegraph poles by the hundreds.

New Jersey.—Millville: The first cold-wave warning of the season was received on the 19th at 1.55 p. m., and the cold wave arrived in time on the 20th with a fall of 31°; on the 24th dandelions were in bloom. Bridgeton: We have had a very remarkable autumn, no killing frost until the 12th; lima beans picked and brought to market as late as the 6th. Rancocas: The month very favorable for belated huskers; some sweet potatoes were being dug on the 15th. Oceanic: November goes out with no frost in the ground, grass fresh and growing, and dandelions in bloom in many places. Toms River: Farmers brought strawberries to market on the 12th. Franklinville: Rather a cold month, being 4.9 below the mean for the past seven years.

New York.—The month was characterized by large ranges of temperature and pressure, and was, on the whole, slightly colder than the average November. The fifth anticyclone of this month, which passed over the Southern States and aided the inflow of warm air toward the depression then over Canada, caused a warm wave, which was terminated by an intense anticyclone on the 19th, and which, in the four days following, reduced the temperature in the northern part of this State more than 40°. Warm waves accompanied the storms of the 24th and 27th, and with the rise of pressure following the latter, the coldest day of November also occurred. Strawberry and raspberry blossoms were seen at South Canisteo on the 1st, and the dandelions were in bloom on the 2d at Malone.

North Carolina.—Quite an uneventful month. The temperature was nearly 2° below the normal, and the precipitation nearly 2 inches. The weather was very pleasant during the greater part of the month. Killing frosts occurred nearly everywhere in the west on the 6th, and over the central part of the State on the 7th and 11th. Weather favorable to all out-door pursuits, but very unfavorable to recently sown grain, such as rye, wheat, etc. Owing to the dry weather, forest fires were very common; dense smoke on the 29th.

North Dakota.—The month was unusually fine in this State. It was warm and bright, with temperature above zero until the 18th, when a cold wave completely covered the State for two days.

Ohio.—The weather during the month was marked by deficient rainfall and temperature and excess of cloudiness. The rainfall was well distributed throughout the month and proved beneficial to the wheat. Sufficient snow fell before the coldest days of the month to serve as a protection to the cereals in the ground.